

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

I. Claim Status

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 11, 18, 21 and 28 are requested to be cancelled, without prejudice or disclaimer. Claims 10 and 20 are currently being amended. Claims 30-31 are being added.

Support for the amendments and new claims can be found throughout the Specification, for example in the paragraphs starting from page 5, line 8 and from page 7, line 1, and Figures 1 and 5-6. The limitation of a gap of about “15 nm or less” from previously presenting (now cancelled) claims 18 and 28 is added to claims 10 and 20, respectively. No new matter is added.

After amending the claims as set forth above, claims 10, 12-17, 19-20, 22-27 and 29-31 are now pending in this application.

II. Specification Amendments

The paragraph starting from Page 5, Line 8 is amended for clarification.

Specifically, the originally filed specification explains on Page 5, Lines 11-13 that “faces 23, 24 have embedded elongate electrical conductors 40 in directly opposed pairs aligned parallel with the plane of hinge webs 36.” It clearly indicates that “the elongate electrical conductors 40 embedded on the surface 23 and the elongated electrical conductors 40 embedded on the surface 24 are disposed in directly opposed pairs aligned parallel with the plane of hinge webs 36,” especially when the description is read in context of the

specification which further explains on Page 5, Lines 8-11 that “the opposed faces 23, 24 of plates 20, 25 are parallel to a high degree of accuracy, and are set at a uniform spacing or gap 50 at which there can be a detectable quantum tunnelling current between opposed conductors [40] in these faces.” This configuration is also shown in Figures 1-3 of the Application. No new matter is added.

III. Objection to Specification and Claim Rejections under 35 U. S. C. § 112

The specification is objected to under 37 CFR 1.75(d)(1) for failing to provide clear support or antecedent basis for terms and phrases in claims 10-29. Claims 10-29 are rejected under 35 U.S.C. 112, first paragraph, for failing to comply with the written description requirement.

Applicants do not concede that the objection is correct. Solely in the interest of expedience, claims 10 and 20 are amended without prejudice or disclaimer to limit the claims to the first direction and the second direction being the same. Further, claims 11 and 21 are cancelled without prejudice or disclaimer.

By way of the response, the objection to specification and the section 112 rejections are now moot.

IV. Claim Rejections under 35 U. S. C. § 102

Claims 10-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Patent Document WO/2004094956 for a patent application by “Michalewicz-1” (i.e., Parent Application) also published as PG PUB US 2006/0285789 for a patent application by “Michalewicz-2” (i.e., the present Application) Applicants respectfully traverse for at least the reasons that follow.

Independent claims 10 and 20 are amended so that they are fully supported by Michalewicz-1. Thus, Michalewicz-1 cannot be used as prior art. Applicants respectfully request a withdrawal of the section 102 rejections.

V. Claim Rejections under 35 U. S. C. § 103

Claims 10-15, 18 and 19, are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii (U.S. 5,461,916) in view of Hill (U.S. 6,137,206) and Kubena (U.S. 5,905,202). Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii in view Hill and Kubena, further in view of Roundtree (U.S. Patent No. 5,977,596). Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii in view of Hill and Kubena, further in view of Jones (U.S. 2003/0036244). Claims 20-23, 25 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii in view of Kubena and Jones. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii in view of Jones and Kubena, further in view of Roundtree. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii in view of Jones and Kubena, further in view of Hill.

Independent claims 10 and 20 are amended to recite that “the surface of the first substrate and the surface of the second substrate are parallel and a gap between the second substrate and the first substrate is about 15 nm or less,” as previously recited in claims 18 and 28, respectively.

Page 6, the last paragraph to Page 7, the first paragraph of the Office Action correctly recognizes that Fuji is silent regarding a gap of about 15 nm or less between the second substrate and the first substrate, as recited in claims 10 and 20 and as previously recited in claims 18 and 28. However, the Office Action points to column 4, lines 15-32 of Kubena and alleges that “it would have been obvious at the time of the invention of this application to one of ordinary skill in the art to have to have used a gap between the first and second substrates of less than 5 nm for its art recognized suitability to allow the initiation of tunneling current.” Applicants respectfully disagree for at least the reasons that follow.

A. There Is No Reason To Combine Fujii and Kubena

Fujii teaches a semiconductor mechanical sensor based on capacitive coupling, and is silent regarding the range of the gap between the two surfaces, e.g., d1 or d2 in different embodiments of Fujii devices (see Fujii, Abstract, Figures 1-2, and related description). On the other hand, Kubena teaches a rotation sensor based on tunneling current (see Kubena,

Abstract), which has a mechanism completely different from the capacitive coupling mechanism used in Fujii device. Applicants respectfully submit that capacitive coupling devices, such as those of Fujii, do not necessarily require a distance between the electrode surfaces as small as that required for initiating tunneling current in tunneling current devices, such as those of Kubena.

The Office Action provides no reason why an ordinary skilled in the art would desire to bring the Fujii surfaces in a very close distance such as about 15 nm or less, as recited in claims 10 and 20. In addition, such a close distance of 15 nm or less may cause the moving surfaces of Fujii to contact each other and render the device of Fujii inoperative. A prima facie obviousness is not established.

B. Even If Fujii And Kubena Are Combined, Not All Claimed Features Are Disclosed

Further, for at least the reasons that follow, the above explained limitations of claims 10 and 20 are not disclosed in any one or more of the applied prior art reference.

Specifically, the portion of Kubena cited in the Office Action reads:

“FIG. 1 shows a sectional view of a z-axis tunneling tip sensor 40 without lateral control electrodes together with an analog feedback circuit 43 which is one type of circuit that can be used to control the sensor's operation. The z-axis tunneling tip sensor can be fabricated on a semiconductor wafer 42 that lies in the plane defined by the x and y axes.

Circuit 43 applies a control voltage via leads 51 and 52 across the cantilever electrode 44 and the control electrode 46 to create an attractive electric field which pulls the cantilever down to a reference position close to the tunneling tip, e.g., 1-2 nm away from the tip. The circuit also applies a bias voltage via leads 51 and 54 across the cantilever electrode and tip sufficient to initiate a flow of tunneling current 55 through them. The circuit is designed to respond to a deflection of cantilever arm 44 by modulating the control voltage while holding the tunneling current constant, so that the value of the control voltage at any given time indicates the degree of cantilever arm flexure. Alternatively, the control voltage could be held constant and tunneling current modulated, or a combination of both approaches could be used, but modulating the control voltages makes the device less susceptible to damage and effectively linearizes the output signal.” (Emphasis Added).

Applicants respectfully submit that the above cited portion of Kubena merely discloses that a distance of 1-2 nm between the tunneling tip and the and the cantilever electrode may allow an initiation of tunneling current. However, the tunneling tip is a sharp tip (i.e, a quasi-zero dimensional object) and can not be equated to either one of the parallel surfaces recited in claims 10 and 20. Thus, Kubena fails to teach that the gap between surface 81 and the bottom surface of the cantilever 92 is 1-2 nm, as alleged in the Office Action.

In contrast, due to the dimension of the tunneling tip 90, the gap between surface 81 and the bottom surface of the cantilever 92 would inherently be in micron scale, much greater than the nanometer scale distance required for initiating tunneling current. Support for this statement can be found in Kubena, column 5, lines 30-34, which reads:

“The cantilever 88 is suspended approximately 1 to 2 microns above the surface 81 of the wafer 80 which may contain a control electrode 99, a test electrode 98, position or velocity sense electrodes 94, 96 and tunneling electrode 90.”
Emphasis Added.

Further, even if the sharp tip of the tunneling tip is considered as one of the surfaces, *arguendo*, such a surface of the tunneling tip can not be parallel to the other surface (i.e., the bottom surface of the cantilever), as recited in claims 10 and 20, because the cantilever 88 is brought close to the tunneling tip by deflection of the arm (see Kubena, column 4, lines 27-31). Thus, the cantilever 88 is inclined with respect to tip 90 as a non-zero angle, rendering it non-parallel.

For at least the above reasons, Applicants respectfully submit that Kubena fails to teach that “the surface of the first substrate and the surface of the second substrate are parallel and a gap between the second substrate and the first substrate is about 15 nm or less,” as recited in claims 10 and 20.

Hill, Roundtree and Jones are cited for disclosing other features of the claims, but fail to cure the deficiencies of Kubena and Fujii described above.

Claims 12-17 and 19 depend from claim 10, and thus are patentable for at least the same reasons as claim 10. Claims 22-27 and 29 depend from claim 20, and thus are patentable for at least the same reasons as claim 20.

Newly added claims 30-31 depend from claims 10 and 20, respectively, and thus are patentable for at least the same reasons as the respective independent claim.

VI. Conclusion

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith,

Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By 

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